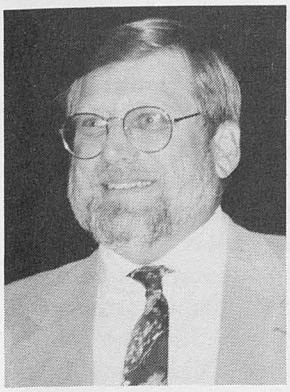

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OPENING GENERAL SESSION
Monday, July 25, 1994

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Superintendent of Sanitation
City of Milwaukee

WINNING THE BIG BATTLE--DEALING WITH HEAVY SNOWFALL

City of Milwaukee Snow and Ice Control Procedures

Good morning. Thank you for inviting me to Lexington. I have always felt that Wisconsin and Kentucky were two of the most beautiful states in America. Except, of course, when they are covered with snow.

Three years ago a Milwaukee Common Council member told me that global warming would make big snowstorms a thing of the past. Based on this information, we made up a slogan, "Cut a rain forest; save a street." But we didn't sell the snow equipment. Or cut the snow budget.

After every mild winter there is pressure to reduce the money allocated to snow and ice control. We met with Milwaukee's budget director last Wednesday on our proposed 1995 budget, and even last year's snowy experience is a faint memory on an 80-degree July day. Snow money is an easy cut in summer. It is like the pastor who was challenged to cut his operating expenses by 50 percent even though the church needed painting. How could he cut the budget and still paint the church, the pastor wondered. Then he got an idea. He bought half the white latex paint he needed and mixed it 50-50 with water. It was a great idea. The church looked beautiful when he finished painting it and he went to bed a happy man. But during the night there was a big thunderstorm. When he went outside the next morning to get his paper he saw that the paint had washed down the walls and the church was surrounded by white puddles. "Lord," the pastor said, "what do I do

now?" The clouds overhead parted and a voice boomed down from heaven, "Repaint and thin no more."

Last winter was a real challenge for us, too. It was the eighth snowiest winter in Milwaukee's history with 82 inches of snow. Our seasonal average is 47 inches. We plowed nine times and had 30 salting operations. It snowed once for 44 straight hours and back-to-back snowstorms dumped 18 inches of snow on us during one week in February. The Department of Public Works is very proud that the schools never closed and the city's businesses and industries did not lose one day last winter because of snow. But there is a cost for this level of service. Sanitation's operating budget includes about $5.3 million for snow and ice control. We are about $3.2 million in the red right now and we still have to make it to the end of December.

The Sanitation Division has a number of responsibilities. We are responsible for all residential solid waste collections, including garbage, recyclables, bulky items, brush, white goods, and leaf collections. We do the street and alley sweeping, mow lots, enforce the weed ordinances, run two inert material landfills, two Self-Help Centers, a Youth Summer Employment Program, various Neighborhood Cleanup Programs, provide civic celebration and special event support including barricades and portable stages, and, oh yes, snow and ice control.

Public safety is the Number One priority when it comes to snow and ice control by the city of Milwaukee's Department of Public Works (DPW). The Sanitation Division coordinates and supervises snow and ice control operations on the city's 1,400 miles of streets. Snow fighting equipment is provided and maintained by the DPW Municipal Equipment Division. Personnel for all eight DPW divisions are involved in plowing operations. A full-scale General Plowing is a DPW team effort.

Two DPW divisions, Sanitation and Municipal Equipment, are involved in all snow and ice control operations. The Forestry Division provides part of the drivers' complement for all salting and plowing operations.

All snow and ice control responses operate from the city's six sanitation districts. Salting, plowing, and sidewalk clearing equipment report to these districts for route assignments.

Sanitation administrators, managers, and supervisors are on duty 24 hours a day, seven days a week, during the snow season on a three-week rotating basis. They are responsible for obtaining, analyzing, and acting on weather forecasts, alerts, and surface sensor data.

Sanitation also is responsible for calling out the 125+ driver/loaders needed as part of a full-scale plowing operation. Driver/loaders are Sanitation employees who drive and load the garbage and recycling packers. Sanitation packers form the backbone of the city's frontline general plowing complement of 364 pieces of city-owned and private contract equipment. The city-owned portion of the complement is com-

posed of 125 collection packers, 84 salt trucks, and 55 other pieces of city equipment like dump trucks, endloaders, recycling trucks, roll-off box trucks and Unimogs. Milwaukee owns 437 pieces of snow-fighting equipment including sidewalk plows.

Our bombardier and other single-purpose pieces of equipment are being replaced by multipurpose equipment such as holders. Holders plow narrow lanes and sidewalks in the winter and are often fitted with sand/salt hoppers. In the summer, they are fitted with mower attachments and have replaced tractor-mowers for unimproved land mowing. Few municipalities can afford single-purpose snowfighting equipment that remains parked during the non-snow months. Milwaukee is no exception. Consequently, most DPW equipment in the municipal fleet is speced to plow snow. Tandem-axle garbage and recycling packers make great plows. Even a roll-off truck becomes an effective plow if you put a couple of scoops of snow in the box of ballast. Dump trucks that work for other DPW divisions in the summer are fitted with hopper inserts in the winter and become our salt trucks.

We also use some of our salt trucks for leaf collection in November. City residents are required to rake their leaves into the street in the fall for collection and composting. We mount "rakes" on the salt truck's plow hoist and use them to push the leaves into big piles for collection. Now, that is multipurpose!

We even fit our large pickup trucks with plows to handle small problems and resident requests after a full-scale plowing is completed. They can handle things like isolated snow islands, small snow furrows, and excessive snow piles plowed across driveway approaches.

Our city equipment is augmented by 100 private contract plows and endloaders. We contract with this equipment for the entire snow season. They must report whenever they are called and be capable of 24-hour-a-day operation. In return, they receive the hourly rate they have bid and a $750 a month standby fee. This fee ensures their availability to the city. If the combination of monthly standby fees and hourly wages earned are less than $5,000, the city will augment their payments to that amount. The seasonal guarantee of $5,000 ensures that the private contractors can recoup their investment in plow equipment and trained operators.

After big storms, additional private equipment can be hired through service agreements. Equipment always becomes available at a flat hourly rate after it has fulfilled snow removal contracts with shopping centers and other businesses.

Municipal Equipment plays a critical role in the mobilization of personnel and equipment for both snowplowing and ice control. Much of this responsibility is centralized in the Division's dispatch office. The dispatch office, located on the second floor of Municipal Equipment's Central Garage, is open and staffed 24 hours a day, seven days a week, every day of the year.

Municipal Equipment provides, services, and maintains all city equipment used to fight snow, and trains and furnishes truck drivers and equipment operators for all snow and ice operations. We also use field mechanic repair trucks, which minimizes downtime for minor repairs. The Division is authorized by the state of Wisconsin to conduct Commercial Drivers License (CDL) testing. They also inspect and approve all private contract snowfighting equipment used by the city.

The city has 800 trained drivers available for snow and ice control including Municipal Equipment and Sanitation operators and drivers, all DPW workers hired since 1984, and non-city winter relief drivers who are hired when necessary during extended operations to relieve city drivers and drive city equipment.

All divisions except Municipal Equipment provide plow route supervisors and progress coordinators to Sanitation during full-scale plowing operations. They assist the district manager and five Sanitation supervisors in each district. The six divisions are Forestry, Traffic Engineering & Electrical Services, the Engineers, Bridges & Buildings, Water, and Street & Sewer Maintenance. Street & Sewer Maintenance also runs bus stops clearing operations after a general plowing is completed.

The city's operational response is based on the severity of the storm. Snow and ice control operations vary in size from intermittent saltings of isolated slippery spots with one or two salt trucks to a full-scale general plowing. The most common operation is a salting operation called a General Ice Control.

In a general ice control, or GIC, a complement of 84 salt spreader trucks are dispatched to the six sanitation districts to treat all city streets as needed. Two supervisors work in each district during a GIC. Trucks are assigned to each district based on roadway miles. The number varies from 11 to 17 salters. The district with 17 includes the downtown area. The trucks are driven by a group of Municipal Equipment drivers and Forestry workers called the "A Team."

Forestry also provides a "B Team" of 84 salt truck drivers so that this equipment can work around the clock in 12-hour shifts when necessary.

All streets are prioritized for both salting and plowing operations based on traffic volume, public transportation routes, and access to emergency services and schools. Both salt and plow routes are divided into "mains" and "districts." The mains, which are done first, are the major arterials and commercial streets. Districts are typically residential streets with light traffic volumes. It takes about two hours to salt the mains and side streets take about five hours. The average cost for a GIC last year (1993-94 season) was $130,000.

The primary mission of any operational response is to remove snow and ice as quickly and economically as possible to restore safe travel, to minimize economic losses to the community and industry, and to facilitate fire and police responses to emergencies. Consequently, operations begin at any time of the day or night.

Although public safety is our primary responsibility, salt is applied at the minimum rate needed to achieve it. We want to minimize any adverse environmental impact. When our mayor, John Norquist, was first elected six years ago, he charged DPW with protecting public safety while reducing and controlling salt usage. We established and follow a "Sensible Salting Policy" (stealing the title shamelessly from the Salt Institute) that has reduced our salt usage by 16 percent. The "Sensible Salting" program has several components. Our goal on main streets is to return the driving lanes to bare pavement. Side streets, however, are treated with a reduced amount of salt. Depending on conditions, treatments vary from a full application at a reduced rate, to spot applications on hills and stops. Why, I have become so salt conscious that I put braker strips on my corn-on-the-cob now. In extremely cold weather a salt/sand mix is applied.

Another factor in Sensible Salting is precise application control. Our truck-mounted spreaders carry Dickey-john microprocessor-based automatic salt spreading controls. They adjust the salt spread rate to changes in truck speed almost instantaneously. This makes it possible to apply salt uniformly in urban stop-and-go-traffic.

We tested these controls for a full winter to make sure they worked satisfactorily before we bought them for our salt trucks. It is important to field test all snow and ice control equipment extensively because of the expense and the problems that poor performance will cause under emergency conditions. Don't take someone's word or rely on a controlled demonstration. Test it yourself under your conditions to see if it is right for your application. A vendor once told me that he had developed a new piece of equipment that would cut my work in half. I told him that if I believed that I would buy two of them.

We also pre-wet our salt with liquid calcium chloride when the temperature is in the mid-20s or predicted to go lower. Liquid calcium chloride increases salt's effectiveness, allows lower application rates, reduces salt bounce on pavement, and helps prevent bonding. Because of this, we also use it at warmer temperatures when there is the potential for a plowing operation.

A Sensible Salting Policy based on controlled usage tailored to storm conditions works. Arbitrary application rate limits do not. And the public is accepting this policy as we all become more aware of our environment. Of course, sensible salting should be combined with responsible salt storage.

We store salt at all six sanitation districts and at two "satellite" locations to reduce salt truck travel times for loads. We are replacing open salt shed storage with enclosed salt storage domes. The domes increase our storage capacity and ensure environmentally safe storage that meets Wisconsin Department of Transportation standards. Only two open salt storage sheds remain. We have six domes now, and a 9,000-ton

dome is scheduled to be built next year at South District 1. When it is completed, salt storage in the two remaining sheds will be discontinued.

Thanks to the low bid process, we have gotten quite a variety of domes. We have a geodesic dome at Central District 1. There is no sense having domes if you can't fill them to capacity. Municipal Equipment modified an agricultural auger and grain hopper for salt loading. It runs off the PTO of a Unimog. It is slow but it works, and it costs $5,000 as compared to $40,000 for a stainless steel portable conveyor. When our last dome is complete we will be able to store 25,000 tons of salt, about half of the 55,000 tons we obtain each winter.

We want at least the capacity to store 6,000 gallons of liquid calcium chloride at each site because the delivery tankers hold about 4,000 gallons. An entire load can be delivered to one location. This makes deliveries easier and cheaper because there is an additional charge for each location where a tanker goes.

We garage an endloader and as many salt trucks as possible in each district. Each district has an endloader operator and two drivers assigned to their bulky item collection packer in the winter. They can quickly respond to local problems. These 18 drivers also can cover a "bridge run." Using 18 salt trucks, we can salt all the overheads in Milwaukee in less than two hours.

The salt truck plow blades are kept at each district. If room permits, collection packer blades also are kept at each district. When bigger storms hit, we try to get once around on the mains with the salt trucks to minimize bonding problems. Then we mount blades on them and start salting and plowing.

As I mentioned before, all plowing operations are managed from the six districts. Sanitation alone handles any plowing operation short of a full-scale general plowing. If the salt trucks aren't enough to handle conditions, but a general plowing isn't required, Sanitation will augment them with collection packers and special equipment for dead-ends and cul-de-sacs. Although there are many variables that affect an operational decision, as a rule-of-thumb, a full-scale general plowing is usually called for snowstorms of four or more inches.

We stencil our blades to indicate the type of equipment on which they should be mounted. We use log or Prentice loaders to move blades to various storage locations and to and from the repair shop. This is another example of multipurpose equipment. The log loaders are used by Forestry to plant trees, by Sanitation to collect brush, and by Municipal Equipment to move plow blades.

We bring in every truck and crew before the snow season to practice plow mounting. Any equipment problems discovered during this drill are repaired by Municipal Equipment. It is important to go into winter with the equipment in good shape.

Although all snow and ice control operations run from the six Sanitation Districts, they are controlled from Sanitation Headquarters on the 5th floor of the Municipal Building located east of City Hall. As snowfighters we must be ready for battle!

We have three area managers. Each is responsible for the daily operations of one-third of the city. They rotate weekly snow duty and the duty area manager is directly responsible for the operational control of all snow and ice control operations.

Detailed weather forecast and condition information is critical for effective snow and ice control. The duty area manager is available at all times, day or night, to receive and analyze forecasts, alerts, and other snow and ice information.

Sanitation contracts with Murray and Trettel (M&T) of Northfield, IL, and Surface Systems Incorporated (SSI) of St. Louis, MO. Murray & Trettel provides winter weather alerts whenever necessary 24 hours a day. These alerts are designed to provide us with information and lead time needed to respond. M&T has provided this service to Milwaukee since 1954. SSI provides three forecasts daily via Sanitation's weather computer. Satellite pictures and radar displays also are received on the computer through a link to SSI. Our weather computer has become an important part of our office. Last January, it won the Super Bowl pool!

SSI also installed and maintains the city's two surface sensors, located on the far northwest and west sides of the city. We are also part of the state of Wisconsin's sensor network. All network sensors can be accessed for weather information. We use Milwaukee County's Hoan Bridge sensor near Lake Michigan to monitor conditions on the east side of town.

In addition to our two weather services, we also consult the local National Weather Service office in Sullivan, Wisconsin. Sullivan is located between Milwaukee and Madison.

Communications are vital during snow and ice control operations. We use two-way radio communication, one channel for daily operations and two channels during a full-scale plowing because of the volume of air traffic that is generated. We also rely heavily on fax machines to send information to and from the districts and the dispatch office. They are great. Detailed operating instructions can be sent to all locations at once, miscommunication is greatly reduced, and a written copy is available throughout long duration operations for reference.

When a major storm is forecast to begin overnight or during a weekend, Sanitation and Municipal Equipment will get the snowplow equipment ready ahead of time. For example, we will have all our collection crews refuel, check the oil, and mount their blades at the end of the workday. It is nice to be ready, but nothing is nicer than taking the blades off the next day because the storm missed!

When a general plow is called, it is important to maintain continuity. Each sanitation district calls its regularly assigned driver/loaders and the Municipal Equipment dispatch office makes plowing assignments based on daily work locations or home address. Plow supervisors and progress coordinators from other divisions and private contract equipment are assigned to each sanitation district on a seasonal basis. Districts try to assign drivers and supervisors to the same routes for every plowing so they are familiar with them. Would you believe that one driver who didn't know his route got lost and called in a breakdown from the corner of "Walk" and "Don't Walk"? And, most drivers like working close to home. Although there was a case once where a driver asked to be assigned to the other side of town because he heard that most accident occur within five miles of home!

The district manager goes over plowing procedures with every plow driver. Each district is responsible for its operation and each district manager has the flexibility to respond to local conditions within the operational framework established by Sanitation "Snow Headquarters."

Once assignments are made, it is on to the streets of Milwaukee.

We try to pair a private plow with a city plow because the city driver is usually more familiar with the neighborhoods (most private drivers don't live in the city while city employees are required to) and for two-way radio communication. Two trucks plow in tandem on most routes. As many as four trucks are grouped together on long, wide arterials to plow them quickly. We plow all snow away from the parking side.

In some neighborhoods with narrow side streets and lots of on-street parking, two plows working together would not be effective. Individual plows are assigned to different sections of a route to work separately.

It takes between 12 and 18 hours to completely plow all 1,400 miles of streets. There are over 7,100 lane miles. To help the media and the public understand how big a job a general plowing in Milwaukee really is, we tell then that if they drove as far as our plows do to plow each street curb-to-curb, they would have to drive from New York City to Los Angeles and back! And it's expensive. The average cost of a general plowing last year was $847,000.

Unfortunately, we buried a lot of Christmas trees left at the curb for collection this winter. We plowed eight times in January and February. If you visited Milwaukee in March, you probably could have watched Christmas trees being collected!

Sometimes we encounter every resident's plowing nightmare. First, the plow comes down one side of the street and buries the Christmas tree. Then it comes back the other way and plows in the driveway that the resident has just finished snowblowing! I will never forget my first snowplowing operation as a new field supervisor in 1974. As I drove down a freshly plowed street, I saw a little old lady leaning on her snow shovel next to the plow furrow that covered her driveway approach.

Wearing a shawl, babushka, and mittens, she looked like every sweet granny you ever saw. As I drove past, she gave me "the finger."

Endloaders are an extremely valuable piece of equipment. They can do almost anything, like clearing dead-ends, cul-de-sacs, intersections, boulevard crossovers, and maneuvering down street that a plow truck couldn't. Eighteen of the 100 private contract pieces are endloaders. During big storms additional loaders are hired through service orders as needed. Because private endloaders are available during the winter, the city does not have to purchase more loaders than it needs for summer work.

Cleanup operations, using a reduced equipment complement, continue after a general plowing is completed. Typically, the salt trucks, some of the contract equipment as needed, and the special equipment continues working to clear the alternate sides of streets, snow islands, and to do touch-up work. Collection packers and other city trucks are knocked off so that Sanitation's collection routes and DPW's other daily work can resume.

The city does not normally remove snow. It is plowed or piled along the sides of the roadways. When snow removal is necessary to widen streets or open a parking area, the snow is hauled to our snow dump adjacent to Lake Michigan.

After a plowing operation is completed, a sidewalk plowing operation using small plows open crosswalks, alley openings, and plows some public sidewalks. Bus stops are cleared by Street and Sewer Maintenance.

Typically, the salt trucks are put back on their salt routes at about 3:00 a.m. to recheck their mains and replow and resalt them as necessary before the morning rush hour.

The task of snow and ice control in a city the size of Milwaukee is a big one. It is only through the dedication of our DPW snowfighters, our contract equipment suppliers and operators, the support of our elected officials, and the cooperation of our citizens that Milwaukee has developed a reputation for expedient and professional snow and ice control. But, after saying all that, things can and do go wrong! A picture of a snowplow tipped over on its side in a ditch hangs in my office to remind me. That is why, when it is snowing at two inches an hour, the wind is gusting at over 40 m.p.h., equipment is getting stuck and breaking down, or even tipping over, the common council president has an accident on a snow-covered street, the phones are ringing off the hook, and camera crews from all the local stations are at the door, it is important to have a positive attitude, and aura of control. Smile!